and *Protopsis* include in part previously described species, and *Gyrodinium* replaces SHÜTT's genus *Spirodinium* which is preoccupied zoologically. The other new genera are established to contain newly discovered species.

A few minor typographical errors occur, but in general the work is remarkably free from them. The text figures are irregularly distributed and frequently many pages from the references to them. It would greatly facilitate the use of the book if the references were by page instead of merely to the figure. These are trifling defects, however, in a work of such unusually permanent value. It is to be confidently expected that its publication will prove a distinct stimulus to further study in a field where there is still much to be learned.—G. W. MARTIN.

A new type of nuclear division.—CHATTON,[2] in a brief but significant paper throws new light on the peculiar nuclear phenomena in the Peridiniales described by LAUTERBORN, JOLLOS, BORGERT, and in his own earlier contributions. His studies were made on species of *Syndinium*, which live parasitically in the body cavity of copepods, especially favorable material because of the small number of chromosomes. These have previously been described as ten somewhat curved filaments from a single pole like the ribs of an umbrella. Further study has shown that this structure is in reality composed of five V-shaped chromosomes with very sharp bends, with the points of the V's converging at the pole. Cleavage takes place throughout the length of the chromosomes, so that ten V-shaped daughter chromosomes are formed. Five of these remain grouped about the original pole; the points of the remaining five become centered about a new pole which is at first close to the original one, then gradually moves away. In some species the cleavage is completed at once; in others the daughter chromosomes remain united at their tips and turn as upon a hinge, so that a bipolar spindle-shaped structure (not a true achromatic spindle) is formed, composed of the two series of V-shaped chromosomes converging at either end. The chromosomes then break apart, and it is this separation which was formerly interpreted as a transverse division of chromosomes, when it is in reality merely the final separation of chromosomes previously formed by longitudinal fission. Nothing resembling a true spindle was seen.

Ordinarily no resting stage appears to occur, but it was observed in certain cases where the development of the peridine had been inhibited by some factor, as, for example, the presence of another parasite. In such cases the nucleus appeared to be composed of a large number of microsomes grouped around a central nucleolus.

A division of this kind, while distinctly simpler than one taking place in connection with the usual achromatic structures, would appear to be quite as

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[2] CHATTON, EDOUARD, Sur un mecanisme cinetique nouveau. La mitose syndienne chez les Peridiniens parasites plasmodiaux. Compt. Rend. Acad. Sci. **173**: 859–862. *fig.* 1. 1921.

effective in securing an exact distribution of the chromatin. The author proposes for it the special term "syndinial mitosis," and expresses the opinion that further study of the free peridines will show that nuclear division in such forms is also of this type.—G. W. MARTIN.

Cytology of Porphyra.—Since a cytological study of the Bangiales might throw light upon the much discussed but little investigated problem as to whether this group is primitive or reduced, whether it should stand at the beginning or at the end of the red algae, ISHIKAWA[3] fixed material and has described several critical stages in the life history of *Porphyra tenera*, a characteristic genus of the order.

The cell wall shows no cellulose reaction, but responds to tests for pectic substances. The large stellate chromatophore contains one conspicuous pyrenoid which has often been mistaken for a nucleus, the real nucleus (only 1.5–2 μ in diameter) being hard to detect in living material, although easy to see in well stained preparations, where it appears as a black globule with no structural differentiation. At division the nucleus elongates, and splits by longitudinal fissures into three filaments which constrict in the middle, so that three pieces go to each pole. The process looks like that described for some Cyanophyceae, especially *Synecocystis*. The figures show neither nucleolus nor nuclear membrane, so that the type appears to be very primitive. The antheridium consists of 64 or 128 cells, and the spermatium has a chromatophore and a group of three chromosomes without any nuclear membrane. The carpogonium is slightly prominent at both ends, the prominence constituting a rudimentary trichogyne. Spermatia were found attached to the trichogyne, but the actual process of fertilization was not observed, nor was there any study of the first and second divisions of the zygote. It seems reasonable, however, to suppose that reduction of chromosomes occurs during these divisions, as in many other algae.

ISHIKAWA would regard Bangiales as a connecting link between the Cyanophyceae and the Florideae, a conclusion which is helped by the fact that *Porphyridium*, a genus sometimes placed in one group and sometimes in the other, has no sexual reproduction. So far as pigments are concerned, some of the Rhodophyceae have phycocyan and some of the Cyanophyceae have phycoerythrin.

Although a careful investigation of the whole life history of several members of the Bangiales is desirable, it seems probable that any future study of the group will confirm ISHIKAWA's conclusions.—C. J. CHAMBERLAIN.

Ecology of Urtica dioica.—In an interesting study of the factors which locally limit the distribution of the common nettle, *Urtica dioica*, OLSEN[4]

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[3] ISHIKAWA, M., Cytological studies on *Porphyra tenera*. Bot. Magazine Tokyo **35**: 206-218. 1921.

[4] OLSEN, CARSTEN, The ecology of *Urtica dioica*. Jour. Ecol. **9**: 1–18. *pl. 1*. 1921.